

APRIL 2015

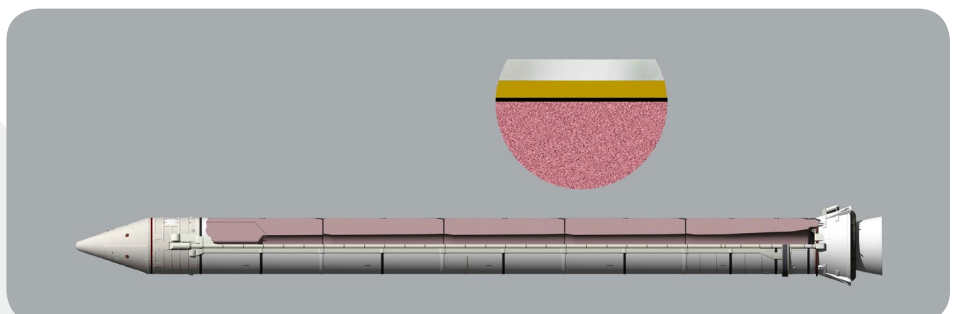
SPACE LAUNCH SYSTEM HIGHLIGHTS

NASA, Orbital ATK Tackle Tough Booster Issues before Successful Ground Test

After months of intense investigation into a development issue, NASA and Orbital ATK successfully test fired a five-segment booster for SLS on March 11 at Orbital ATK's test facilities in Promontory, Utah. Read the full story about the investigation [here](#). (Orbital ATK)



When boosters are ignited, temperatures reach more than 5,000 degrees Fahrenheit from the combustion gases, which can melt the hardware. That's why insulation is needed for each booster segment. Once each booster segment is insulated and lined, they are filled with about 280,000 pounds of propellant and allowed to solidify. (Orbital ATK)



Massive Tank for SLS Advanced Booster Concept Moves to Mississippi for Testing



Now that's a wide load. An 18-foot-wide, 10,000-plus-pound cryogenic tank recently traveled by road and by river from NASA's Marshall Space Flight Center in Huntsville, Alabama, to a Dynetics Inc. test facility in Iuka, Mississippi. NASA plans to evolve SLS to provide an unprecedented lift capability of 130 metric tons (143 tons) to enable missions even farther into our solar system. To do that, the SLS will require an advanced booster with more thrust than any existing U.S. liquid- or solid-fueled boosters. Huntsville-based Dynetics is one of four companies contracted under a NASA Research Announcement to develop technologies to improve the affordability, reliability and performance of an advanced booster for a future version of the SLS. These initiatives are examining advanced booster concepts with risk-reduction activities and hardware demonstrations. The cryogenic tank is part of that work, and it was assembled using friction-stir-welding tools at the Marshall Center. Read the full story [here](#). (NASA/MSFC)

Crews lower the cryogenic tank onto a barge at NASA's dock on the Tennessee River. From there, the tank was delivered to a Dynetics test facility in Iuka, Mississippi, to verify that its structural design and manufacturing processes meet all NASA requirements. (NASA/MSFC)



Spaceflight Partners: Teledyne Brown Engineering

EDITOR'S NOTE: Every month, Space Launch System Highlights turns the spotlight on one of the many industry partners helping to create the largest rocket ever built for human space exploration. In this issue, we profile Teledyne Brown Engineering of Thousand Oaks, California.

Teledyne Brown Engineering is continuing its 60-year tradition of providing innovative solutions and quality performance for our nation's space program by serving as the prime contractor for the Launch Vehicle Stage Adaptor (LVSA) for the SLS.

The LVSA, a critical element of the SLS, will connect the rocket's 27.5-foot-diameter core stage and 16.4-foot-diameter Interim Cryogenic Propulsion Stage (ICPS). In addition to providing structural support for launch and separation loads, the LVSA will also protect the delicate electrical devices in the propulsion systems from the extreme conditions encountered in the challenging launch environment.

Teledyne Brown Engineering is partnering with NASA's Marshall Space Flight Center in Huntsville, Alabama, to use its Advanced Welding Facility for assembly of LVSA segments, applying extensive experience and capabilities in the manufacturing of high-tolerance, precision components. In April 2015, Teledyne and NASA successfully completed the critical design review for the LVSA.

Launching on SLS is the Orion Multi-Purpose Crew Vehicle. The Orion vehicle is NASA's first spacecraft designed for long-duration, human-rated, deep-space exploration. Orion will transport humans to interplanetary destinations beyond low-Earth orbit, such as asteroids, the moon and eventually Mars, and return them safely back to Earth. Teledyne Brown Engineering is helping to ensure crew safety by providing support to NASA for the Launch Abort System (LAS). The LAS is a tower system, attached on top of the Orion crew capsule, and is able to take



Employees of AMRO Fabricating Corporation of South El Monte, California – a supplier to Teledyne Brown Engineering – work on the production of a forward panel for the Launch Vehicle Stage Adaptor. (TBE)

the capsule and crew to safety in the event of a failing vehicle – whether at the launch pad or during early ascent.

Teledyne Brown's experienced systems engineers conducted research and risk analysis on the LAS propulsion system as well as corresponding control analysis to determine vehicle trajectory and ensure vehicle stability. Teledyne is also responsible for performing essential technical reviews and requirements assessments for the LAS module, integrated system, subsystems and components.

Teledyne also was instrumental in building one-of-a-kind, complex parts from print for the Orion capsule, including structural elements and components for the critical heat shield, which must withstand temperatures of 4,000 degrees Fahrenheit.

Cameras at SLS Booster Test will Provide Critical Data for Rocket's First Flight



Marshall Center engineers Jeremy Myers, left, and Jonathan Pryor set up cameras on the test stand at Orbital ATK's facilities in Promontory, Utah, ahead of the successful March 11 SLS booster ground test. Data from the camera footage will be used to determine the camera settings for the first flight of SLS. Read the full story [here](#). (NASA/MSFC)

A screenshot of the cameras cycling through different settings during the two-minute booster firing. (NASA/MSFC)



Pegasus Barge Work Continues on the Bayou



On Feb 5, SLS Program Manager Todd May, left, Marshall Center Operations Director Steve Doering, and other agency representatives, including NASA astronaut Steve Bowen, visit Conrad Industries Shipyard near Morgan City, Louisiana. The purpose of the visit was to thank employees for their work on the Pegasus barge. Conrad has made modifications to the barge, which is near completion, it will carry the large core stage of the SLS. (NASA/Michoud)

Crews at Conrad Shipyard in Morgan City, Louisiana, complete a 250-foot-long metal canopy for NASA's Pegasus barge. The vessel will be used to transport the massive SLS core stage. The final modifications, testing, closeout and delivery of Pegasus are scheduled for completion this summer. For more on Pegasus, click [here](#). (NASA/Michoud)



Executive Leadership Changes



Steve Doering
(NASA/MSFC)

With announcement of the retirement of Tony Lavoie, who is currently serving as manager of the SLS Stages Office, the following executive leadership changes are effective immediately:

- Steve Doering is reassigned from the position of director of the Marshall Center's Office of Center Operations to manager of the SLS Stages Office.
- Roy Malone is reassigned from the position of director of the Michoud Assembly Facility to director of Marshall's Office of Center Operations.
- Bobby Watkins is reassigned from the position of director of the Marshall Center's Office of Strategic Analysis and Communications to director of the Michoud Assembly Facility.

As manager of the SLS Stages Office, Doering will be responsible for overseeing the design and development of the 200-foot core stage, the structural backbone of the SLS. He has served in executive positions of increasing scope and responsibility and possesses extensive experience in program and project management, resources management, and strategic alignment in support of NASA's human spaceflight endeavors, including the Space Shuttle, ISS and Constellation programs.



Roy Malone
(NASA/MSFC)

Assuming responsibility as director of the Center Operations Office, Malone will be responsible for the organization that provides comprehensive, integrated and customer-driven institutional services to enable the center and agency to achieve mission success. These activities encompass a broad range of diverse products and services including the design, operation and maintenance of the total facility. Malone possesses extensive experience in strategic planning, technical and institutional expertise, program and project support, systems engineering, and safety and quality engineering.



Bobby Watkins
(NASA/MSFC)

As Michoud director, Watkins will manage one of the world's largest and most unique multi-tenant manufacturing sites providing vital support to NASA exploration and discovery missions, including the SLS and Orion spacecraft. Throughout his 29-year career, Watkins has served in multiple executive positions at the Marshall Center and Johnson Space Center. Immediately prior to his new position, he served on a detail assignment as director of the Legislative Liaison Division at NASA Headquarters.

EmpowHERing Women

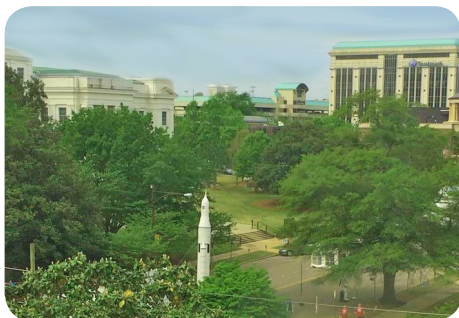
Taking part in the "Cool Careers in STEM" panel April 25 at the Powherful Summit at Dillard University in New Orleans are, from left, moderator Soledad O'Brien; Tashika Charles, program manager for Chevron's Upstream Workflow Transformation Reservoir Management; Renee Horton, SLS lead metallic and weld engineer at NASA's Michoud Assembly Facility in New Orleans; and Virginia Cook Tickles, a cost analysis engineer at NASA's Marshall Space Flight Center in Huntsville, Alabama. The summit, which drew 225 participants, is focused on education, professional and personal development of the next generation of women. (NASA/Michoud)



On the Road...



SLS's David Hitt talks about the rocket April 29 with students at Sacred Heart School in Cullman, Alabama. (NASA/MSFC)



The inflatable SLS on display April 9 during Alabama Aerospace Week in Montgomery. (NASA/MSFC)



Some 90 sixth-grade students at Horizon Elementary School in Madison, Alabama, get schooled on the rocket and the journey to Mars from SLS's Twila Schneider. (NASA/MSFC)



SLS's Kirk Pierce, left foreground, talks about the journey to Mars on April 15 with students from Lewis Palmer High School of Monument, Colorado. The students were visiting the NASA booth at the Space Symposium in Colorado Springs, Colorado. (NASA/MSFC)



SLS engineer Markeeva Morgan speaks to NASA Student Launch participants April 8 at the Marshall Space Flight Center. (NASA/MSFC)



SLS Strategic Communications Manager Kimberly Robinson talks to participants of the 2015 NASA Human Exploration Rover Challenge on April 18 at the event's awards ceremony, held at the U.S. Space & Rocket Center. "NASA has committed to leading the international effort to extend human presence into our solar system," Robinson said. (NASA/MSFC)

SLS on Deck:

Follow SLS on:



- SLS Program critical design review kick off
- RS-25 engine testing
- NASA Day in Baton Rouge